0.a. Goal

Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture

0.b. Target

Target 2.5: By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed

0.c. Indicator

Indicator 2.5.1: Number of (a) plant and (b) animal genetic resources for food and agriculture secured in either medium- or long-term conservation facilities

0.e. Metadata update

March 2021

0.f. Related indicators

The component on animal genetic resources has linkages with indicators 2.5.1a on plants and 2.5.2.

0.g. International organisations(s) responsible for global monitoring

Food and Agriculture Organization of the United Nations (UN FAO)

1.a. Organisation

Food and Agriculture Organization of the United Nations (UN FAO)

2.a. Definition and concepts

Definition:

The conservation of plant and animal genetic resources for food and agriculture (GRFA) in medium or long term conservation facilities (*ex situ*, in genebanks) represents the most trusted means of conserving genetic resources worldwide. Plant and animal GRFA conserved in these facilities can be easily used in breeding programmes as well, even directly on-farm.

The measure of trends in *ex situ* conserved materials provides an overall assessment of the extent to which we are managing to maintain and/or increase the total genetic diversity available for future use and thus protected from any permanent loss of genetic diversity which may occur in the natural habitat, i.e. *in situ*, or on-farm.

The two components of the indicator 2.5.1, plant (a) and animal (b) GRFA, are separately counted.

Animal genetic resources

The animal component is calculated as the number of local breeds (i.e. being reported to exist only in one country) stored within a genebank collection with an amount of genetic material stored which is required to reconstitute the breed in case of extinction (further information on “sufficient material stored to reconstitute a breed” can be found in the Guidelines on Cryconservation of Animal Genetic Resources, FAO, 2012, accessible at http://www.fao.org/docrep/016/i3017e/i3017e00.htm). The guidelines have been endorsed by the FAO Commission on Genetic Resources for Food and Agriculture at its Thirteenth Regular Session (http://www.fao.org/docrep/meeting/024/mc192e.pdf).

Concepts:

Animal genetic resources

Breed: A breed is either a sub-specific group of domestic livestock with definable and identifiable external characteristics that enable it to be separated by visual appraisal from other similarly defined groups within the same species, or a group for which geographical and/or cultural separation from phenotypically similar groups has led to acceptance of its separate identity.

Medium or long term conservation facilities: Biological diversity is often conserved *ex situ*, outside its natural habitat, in facilities called genebanks. In the case of domestic animal diversity, *ex situ* conservation includes both the maintenance of live animals (*in vivo*) and cryoconservation.

Cryoconservation is the collection and deep-freezing of semen, ova, embryos or tissues for potential future use in breeding or regenerating animals.

2.b. Unit of measure

Number of local breeds

2.c. Classifications

International standards and classifications used have been endorsed by the FAO Commission on Genetic Resources for Food and Agriculture at its Thirteenth Regular Session (http://www.fao.org/docrep/meeting/024/mc192e.pdf).

3.a. Data sources

Animal genetic resources

National Coordinators for Management of Animal Genetic Resources, nominated by their respective government, provide data to the Domestic Animal Diversity Information System (DAD-IS) (http://dad.fao.org/). DAD-IS allows countries the storage of data on animal genetic resources being secured in either medium or long term conservation facilities as needed for the indicator.

3.b. Data collection method

The indicator is related to a monitoring framework endorsed by the FAO Commission on Genetic Resources for Food and Agriculture in which the status and trends of plant and animal genetic resources are described through globally agreed indicators and regular country-driven assessments. Officially appointed National Focal Points / National Coordinators report directly to FAO, using a format agreed by the FAO Commission on Genetic Resources for Food and Agriculture.

Sessions of the intergovernmental technical working groups on plant and on animal genetic resources for food and agriculture allow for formal consultation processes.

3.c. Data collection calendar

Animal genetic resources

Data in DAD-IS can be updated throughout the whole year.

3.d. Data release calendar

Animal genetic resources

First quarter of the year.

3.e. Data providers

The officially nominated National Focal Points / National Coordinators. For information by country see for animal genetic resources http://www.fao.org/dad-is/national-coordinators/en/ .

3.f. Data compilers

Food and Agriculture Organization of the United Nations (UN FAO)

3.g. Institutional mandate

The National Coordinators for Management of Animal Genetic Resources are responsible for the provision of national data the indicator is based on. Their Terms of Reference have been endorsed by the Commission on Genetics Resources for Food and Agriculture and are described in more detail in: *Developing the institutional framework for the management of animal genetic resources*.

FAO Animal Production and Health Guidelines. No. 6. Rome. (Accessible at http://www.fao.org/3/ba0054e/ba0054e00.pdf).

4.a. Rationale

Genetic resources for food and agriculture provide the building blocks of food security and, directly or indirectly, support the livelihoods of every person on earth. As the conservation and accessibility to these

resources are of vital importance, medium- or long- term conservation facilities (genebanks) to preserve and make these resources and their associated information accessible for breeding and research have been established at country, regional and global levels. Inventories of genebank holdings provide a dynamic measure of the existing plant and animal diversity and its level of preservation. Data relevant to this indicator facilitate the monitoring of diversity secured and accessible through genebanks and support the development and updating of strategies for the conservation and sustainable use of genetic resources.

The indicator is related to a monitoring framework endorsed by the FAO Commission on Genetic Resources for Food and Agriculture in which the status and trends of plant and animal genetic resources are described through globally agreed indicators and regular country-driven assessments.

The number of materials conserved under medium- or long-term storage conditions provides an indirect measurement of the total genetic diversity, which are managed to secure for future use. Overall, positive variations are therefore approximated to an increase in the agro-biodiversity secured, while negative variations to a loss of it.

4.b. Comment and limitations

Animal genetic resources

Information on cryoconserved material in the Domestic Animal Diversity Information System DAD-IS needs to be updated on a regular base.

4.c. Method of computation

Animal genetic resources

For the animal component the indicator is calculated as the number of local breeds with enough genetic material stored within genebank collections allowing to reconstitute the breed in case of extinction (based on the Guidelines on Cryconservation of animal genetic resources, FAO, 2012, http://www.fao.org/docrep/016/i3017e/i3017e00.htm).

4.d. Validation

There is no validation process in place.

4.e. Adjustments

Not applicable.

4.f. Treatment of missing values (i) at country level and (ii) at regional level

- At country level

For animals, for a given breed, if no data are provided for a respective year, it is assumed that the storage status remains the same as for the last year for which data have been reported. In this case the nature of data is considered to be estimated.

- At regional and global levels

Missing values are treated as such and not replaced by estimates.

4.g. Regional aggregations

Aggregates are the sum of country values.

4.h. Methods and guidance available to countries for the compilation of the data at the national level

For the animal component the National Coordinators for the Management of Animal Genetic Resources provide the type of material (e.g. semen samples, embryos, somatic cells) cryo-conserved within the framework of a cryconservation programme, as well as the number of the respective male and female donors to the Domestic Animal Diversity Information System DAD-IS. FAO provides internationally endorsed guidelines on the definition of “sufficient” material (see FAO. 2012. Cryoconservation of animal genetic resources. FAO Animal Production and Health Guidelines No. 12. Rome. (available at http://www.fao.org/docrep/016/i3017e/i3017e00.pdf)

4.i. Quality management

FAO provides regular training to National Coordinators related to data collection and entering data into the official system, DAD-IS. The indicators itself is automatically calculated in DAD-IS.

4.j. Quality assurance

FAO is responsible for the quality of the internal statistical processes used to compile the published datasets.

FAO. 2012. Cryoconservation of animal genetic resources. FAO Animal Production and Health Guidelines No. 12. Rome. (available at http://www.fao.org/docrep/016/i3017e/i3017e00.pdf)

4.k. Quality assessment

Each second year FAO is organizing a global National Coordinators’ Workshops to assess and discuss the collection of data the indicator is based on. The indicators itself is automatically calculated in DAD-IS.

5. Data availability and disaggregation

Data availability:

Animal genetic resources

The analysis of country reports to FAO provided by 128 countries in 2014 for the preparation of ‘The Second Report on the State of the World’s Animal Genetic Resources for Food and Agriculture’ provided a first baseline with regard to the number of national breed populations where sufficient

material is stored. As of February 2021, according to DAD-IS, genetic material is cryoconserved for only a very low proportion (9 percent) of local breeds and for only around 2.6 percent of breeds is the quantity of stored material estimated to be sufficient for population reconstitution..

Time series:

Animal genetic resources

DAD-IS data are available since 2010 up to 2020.

Disaggregation:

For both plant and animal components geographic disaggregation (national, regional, global) is made. Grouping by sex, age etc. is not applicable.

6. Comparability/deviation from international standards

Sources of discrepancies:

There are no internationally estimated data. Data on this indicator are all produced by countries and regional or international centres.

7. References and Documentation

Plant genetic resources

National Focal Points for the monitoring of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture and the preparation of country reports for The Third Report on the State of the World's Plant Genetic Resources for Food and Agriculture: http://www.fao.org/agriculture/crops/thematic-sitemap/theme/seeds-pgr/gpa/national-focal-points/en/

List of descriptors for reporting on the Plant Component of SDG indicator 2.5.1, FAO 2017 http://www.fao.org/fileadmin/user_upload/wiews/docs/SDG_251_data_requirement_sheet_table_EN.docx

Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture: http://www.fao.org/docrep/015/i2624e/i2624e00.htm

Second Report on the State of the World’s Plant Genetic Resources for Food and Agriculture

http://www.fao.org/docrep/013/i1500e/i1500e00.htm

Genebank Standards for Plant Genetic Resources for Food and Agriculture, FAO, 2014

http://www.fao.org/documents/card/en/c/7b79ee93-0f3c-5f58-9adc-5d4ef063f9c7/

Targets and Indicators for Plant Genetic Resources for Food and Agriculture, In: Report of the Fourteenth Regular Session of the Commission on Genetic Resources for Food and Agriculture,

CGRFA-14/13/Report, Appendix C, http://www.fao.org/docrep/meeting/028/mg538e.pdf

Reporting Format for Monitoring the Implementation of the Second Global Plan of Action for Plant Genetic Resources for Food and Agriculture, CGRFA-15/15/Inf.9, http://www.fao.org/3/a-mm294e.pdf

FAO/Bioversity Multi-Crop Passport Descriptor (MCPD) v. 2

http://www.bioversityinternational.org/fileadmin/user_upload/online_library/publications/pdfs/FAO-Bioversity_multi_crop_passport_descriptors_V_2_Final_rev_1526.pdf

Animal genetic resources

Preparation of the First Report on the State of the World's Animal Genetic Resources

Guidelines for the Development of Country Reports. Annex 2. Working definitions for use in developing country reports and providing supporting data.

http://www.fao.org/docrep/004/y1100m/y1100m03.htm

Guidelines on Cryconservation of Animal Genetic Resources, FAO, 2012, accessible at http://www.fao.org/docrep/016/i3017e/i3017e00.htm

National Coordinator for Management of Animal Genetic Resources:

http://dad.fao.org/cgi-bin/EfabisWeb.cgi?sid=-1,contacts

Status of Animal Genetic Resources – 2016, CGRFA/WG-AnGR-9/16/Inf.3,

http://www.fao.org/3/a-mq950e.pdf

Guidelines on In vivo Conservation of Animal Genetic Resources, FAO, 2013, http://www.fao.org/docrep/018/i3327e/i3327e.pdf

The Second Report on the State of the World’s Animal Genetic Resources for Food and Agriculture

http://www.fao.org/3/a-i4787e.pdf